

Application No. 09/997,024**Docket No. H30-4969 CIP1****REMARKS**

Claims 1, 3-7, 9-22, 35-36, and 38-39 are pending currently. To facilitate the prosecution of this application, claims 1, 35, and 38 have been amended to recite a specific temperature range of the supercritical-like solvent in which the metallocene catalyst may be dissolved. Claims 8 and 37 have been cancelled. No new matter has been added.

I. Examiner's Informal Remarks

The Examiner has indicated that it is not clear whether the support material recited in claims 20, 21, 38, and 39 is the same or different chemically with respect to the first support material. Claims 20, 21, 38, and 39 refer to the deposition of a first and a second metallocene catalyst on the *same* support. The deposition of these two catalyst can occur either simultaneously or sequentially. The antecedent "said" used to modify the term "support material" in claims 20, 21, 38, and 39, establishes that the support material referred to in these claims is the same support material referred to in prior claims upon which claims 20, 21, 38, and 39 depend. Since there is only one support material, there can be no distinction with respect to the chemical nature of the material supporting the first and second metallocene catalyst. Support for this reading of the claims can be found at pages 20 – 21 of the original specification.

Claim 37 has been cancelled and, thus, the Examiner's comment that this claim does not further limit the claim from which it depends is moot.

Application No. 09/997,024**Docket No. H30-4969 CIP1****II. Examiner's Rejection Under 35 U.S.C. § 103(a)**

The Examiner has rejected claims 1, 3-22, and 35-39 under 35 U.S.C. § 103(a) as being patentable over U.S. Pat. No. 4,916,108 (McLaughlin) in view of U.S. Pat. No. 4,871,705 (Hoel) and U.S. Pat. No. 5,744,556 (Keller).

The Examiner graciously granted an in-person interview with Applicant on July 1, 2004. During that interview, Applicant proposed amending the claims to limit the solvents which may be utilized to those which have a critical temperature from about -10° C to about 200° C. Applicant pointed out that the present application is directed toward the deposition of a metallocene catalyst dissolved in a supercritical fluid. The covalent bonds of a metallocene make it susceptible to degradation at high temperatures. Indeed, subjecting a metallocene to temperatures above 200° C would essentially destroy the compound's structure. Thus, to effectively dissolve a metallocene catalyst in a supercritical fluid, the critical temperature of the solvent must be below 200° C. Examples of solvents in a supercritical state that may be used to dissolve metallocenes include carbon dioxide ($T_{crit} = 31.1^{\circ} \text{C}$), difluoromethane ($T_{crit} = 78.2^{\circ} \text{C}$), and chlorotrifluoromethane ($T_{crit} = 29.2^{\circ} \text{C}$). Applicant respectfully submits that the proposed amendment distinguishes the claimed invention over the cited prior art.

A. McLaughlin Does Not Suggest the Desirability of the Claimed Invention.

Applicant respectfully disagrees with the Office's assertion that the claimed invention is obvious over McLaughlin because this reference lacks any suggestion or motivation to modify its teachings to produce the claimed invention. Specifically, to

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produce the claimed invention, McLaughlin would have to be modified in a way that would be unsatisfactory for its intended purpose.

To establish a prima facie case of obviousness, there must be some suggestion or motivation in the cited reference, either explicitly or implicitly, to modify the teachings of the prior art to produce the claimed invention. MPEP § 2143. If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no motivation to make the proposed modification. MPEP § 2143.01. Moreover, the reference as a whole must be considered when ascertaining the differences between the prior art and the claimed invention. MPEP § 2141.02.

Here, the object of McLaughlin is to produce a supported metal catalyst having maximum coverage of the surface area, wherein "the maximum coverage of the surface area ... is accomplished by dissolving the metal catalyst in salt form in a supercritical fluid solvent." McLaughlin, col. 3, lines 25 – 37. McLaughlin also states that "[t]o be effective as an impregnation solvent, a supercritical fluid must be chosen which will dissolve the catalytic metal salt." McLaughlin, col. 6, lines 17 – 19. The favored solvents for dissolving metal salts generally have a critical temperature above 200° C. In fact, all of the preferred solvents exemplified in McLaughlin have a critical temperature above 200° C, e.g. ethanol ($T_{crit} = 243.4^{\circ} \text{C}$), hexane ($T_{crit} = 234.2^{\circ} \text{C}$), and water ($T_{crit} = 374.4^{\circ} \text{C}$). Unlike metallocenes, metal salts (and their corresponding metal ions in solution) are thermally stable at high temperatures and thus do not decompose at the high temperature required for their preferred solvents to reach supercritical conditions. Accordingly, McLaughlin clearly favors the use of solvents having a critical temperature above 200° C.

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McLaughlin provides only one example of a solvent (carbon dioxide) that has a critical temperature below 200° C. Yet this solvent is not favored by McLaughlin.

McLaughlin states that the examples of inorganic metal salts it provides are not satisfactorily dissolved in carbon dioxide. (“[N]ot all of catalytic metals, including those mentioned above, are soluble to the extent required to achieve maximum support surface adsorption in supercritical carbon dioxide.” McLaughlin, col. 6, lines 44 – 49.)

McLaughlin suggests that a metal salt formed with an organic anion may be soluble in carbon dioxide to some extent, but the selection of carbon dioxide as a solvent is certainly not based upon its low critical temperature.

In contrast, the claimed invention (as amended) is limited to solvents having a critical temperature below 200° C. Modifying McLaughlin to limit the deposition process in this way would surely undermine its objective which, as a whole, is to dissolve a sufficient amount of metal salt into a supercritical fluid so as to produce the maximum deposition area on a support. Indeed, such a modified process would seem to exclude most of the metal salts exemplified in McLaughlin (i.e. cobalt chloride, potassium iodide, potassium bromide, aluminum chloride, aluminum bromide, and potassium carbonate). Thus, modifying the process of McLaughlin in accordance with the claimed invention would render the McLaughlin process unsatisfactory for its intended purpose, and, thus, there can be no motivation to do so. Since there is no motivation to make the proposed modification, the claimed invention is not rendered obvious by McLaughlin.

Application No. 09/997,024**Docket No. H30-4969 CIP1****B. Keller Teaches a System That Is Physically Impossible and thus Is Not Prior Art**

With respect to Keller, the Office cannot premise a rejection under 35 U.S.C. § 103(a) based on a reference where the disclosure relies on a physical impossibility.

Keller, although purporting to provide examples of solvent systems in a supercritical state, in fact utilizes solvents that are not in a supercritical state. In each example used by Keller to illustrate a "supercritical fluid", the solvent mixture (including the catalyst) was charged into a spray delivery system and was set at a temperature well below the solvent's critical temperature. In Example 2, the bulk of the solvent consists of isopentane which has a critical temperature of 187° C. Yet, the temperature of this system was only 46° C. Likewise, in Example 3, the bulk of the solvent consists of isopentane but the system temperature was only between 25° C and 35° C. The operating temperatures of these two examples are considerably below the critical temperature of the solvent, and thus cannot be in a supercritical state.

A disclosure of a physical impossibility is intrinsically not prior art. Thus, the fact that Keller relies on a system that is physically impossible precludes this reference from being a basis for an obviousness rejection.

C. Keller Teaches Away From the Claimed Invention.

Moreover, it is improper to rely on a reference that teaches away from its combination with another reference. MPEP § 2145.

Keller discloses a method that employs *unsupported* catalysts instead of supported catalysts. In fact, Keller at column 1, lines 36 – 43 states: "the use of a catalyst support

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can lead to catalyst sites which have different chemical properties and therefore lead to the formation of different polymers compared to polymers being formed at other catalyst sites. ... The use of non-supported catalysts obviates the problems caused by the presence of a catalyst support ...” Here, Keller suggests that depositing a catalyst that is dissolved in a supercritical fluid onto a supported structure is actually disfavored due to the formation of polymer by-products. Thus, Keller teaches away from the claimed invention and is, therefore, inappropriate as a reference in support of a § 103(a) rejection.

D. Hoel Fail To Demonstrate the Desirability of It's Combination with the Other References

With respect to Hoel, the Office must demonstrate that the reference suggests the desirability, and thus the obviousness, of its combination with the other references.

Hoel discloses the use of liquid solvents to dissolve metallocene catalysts. Hoel does not, however, suggest the advantage of dissolving metallocene catalysts in supercritical fluids to increase the impregnation of the catalyst on a porous support.

Since Hoel does not suggest the advantage of combining its teachings with those of the other references cited by the Office, it cannot be utilized to support a rejection under 35 U.S.C. § 103(a).

III. Conclusion

In view of the aforementioned arguments and the proposed amendments, Applicant asserts that the claimed invention is in condition for allowance and respectfully requests that the Office issue a Notice of Allowance at the earliest possible date.

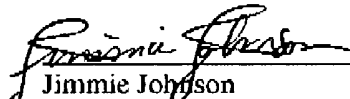
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The Office is invited to contact Applicant's undersigned counsel to further the prosecution of this case in any way.

Respectfully submitted,

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